Tectonic Plate Boundaries

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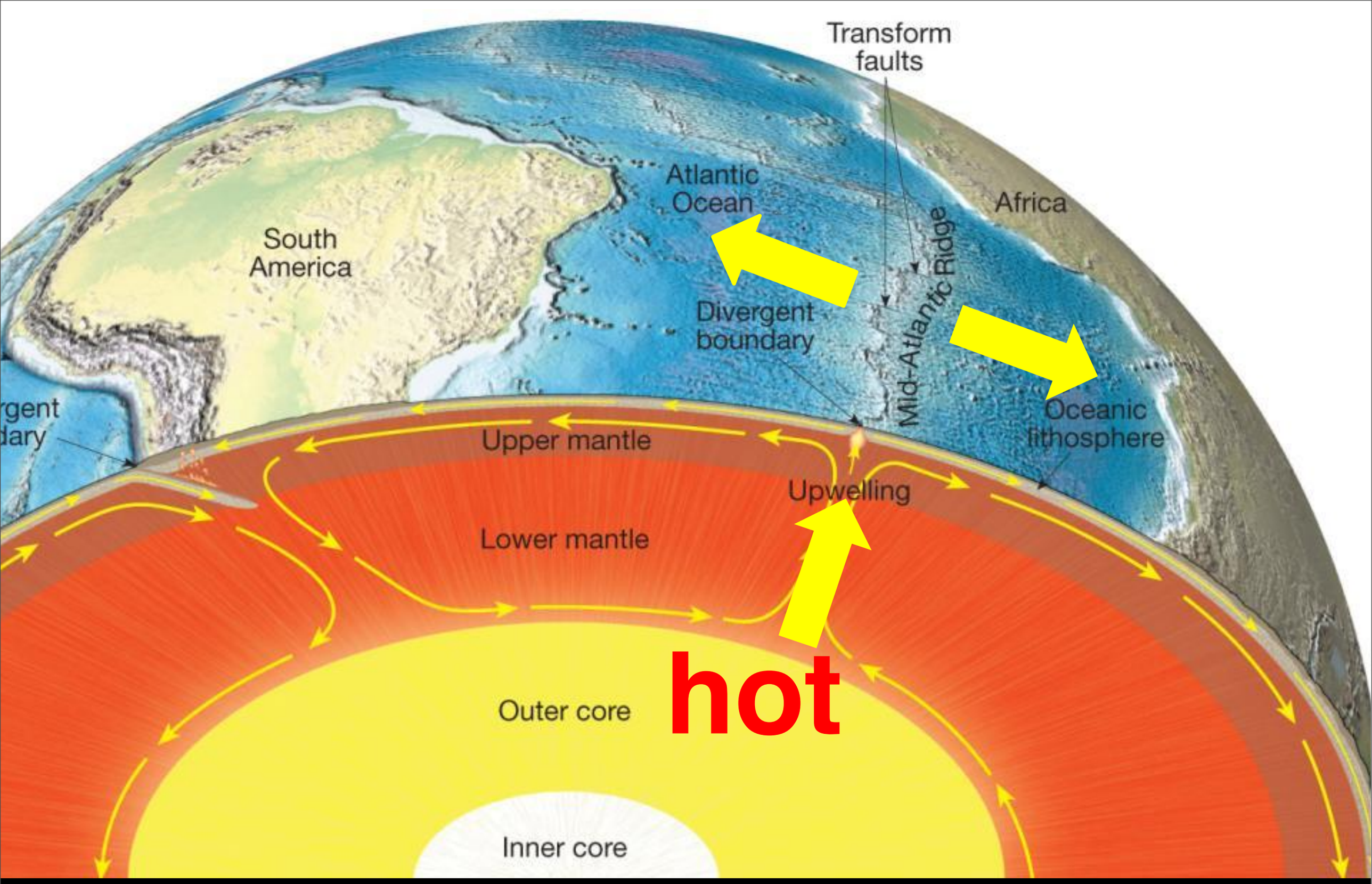
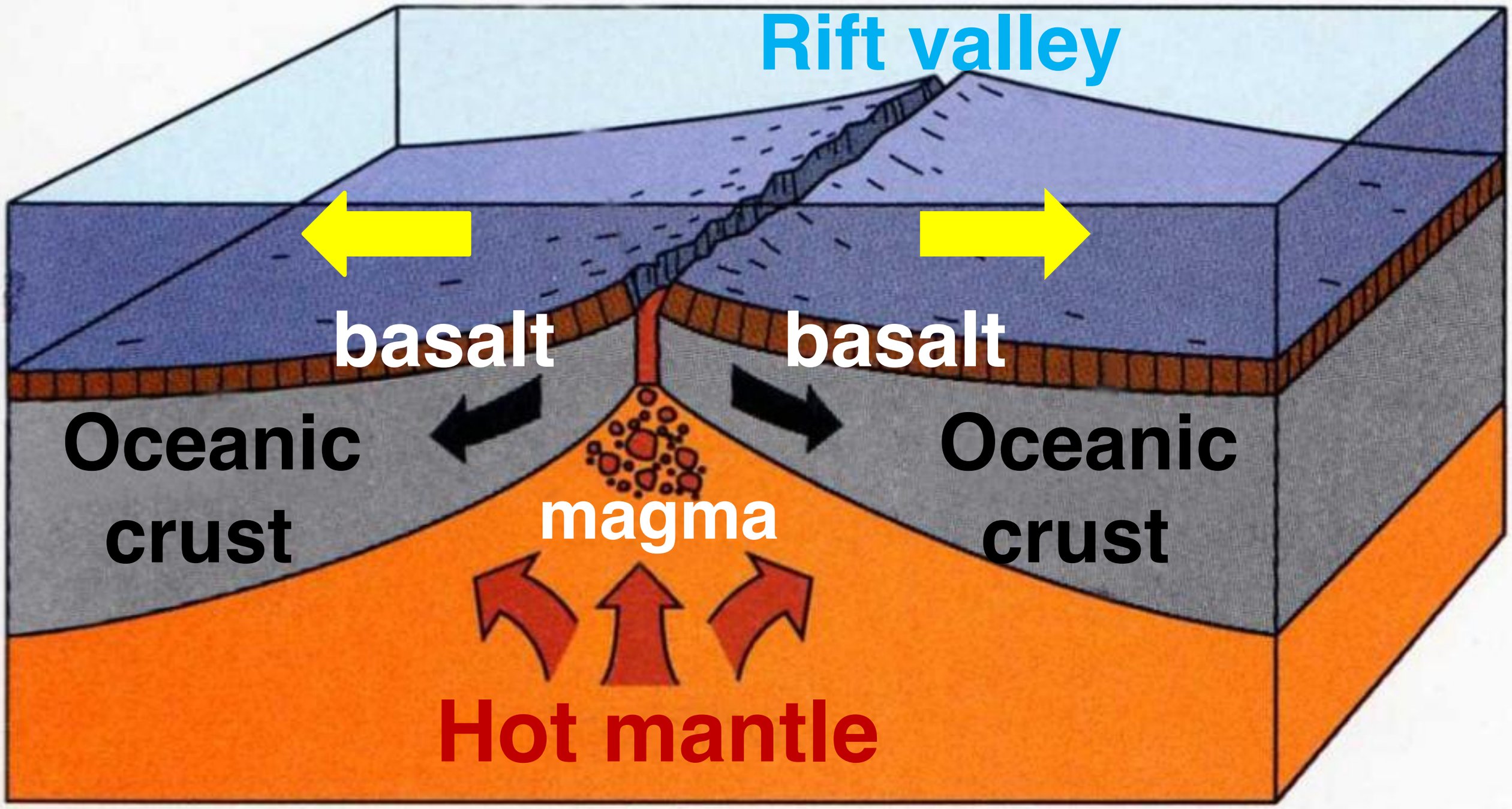
Three Plate Boundaries

- Divergent Plate Boundaries
    - aka. Spreading Centers
- Convergent Plate Boundaries
    - aka. Subduction Zones
- Transform Boundaries
    - aka. Transform Faults

Divergent Plate Boundaries



Spreading center

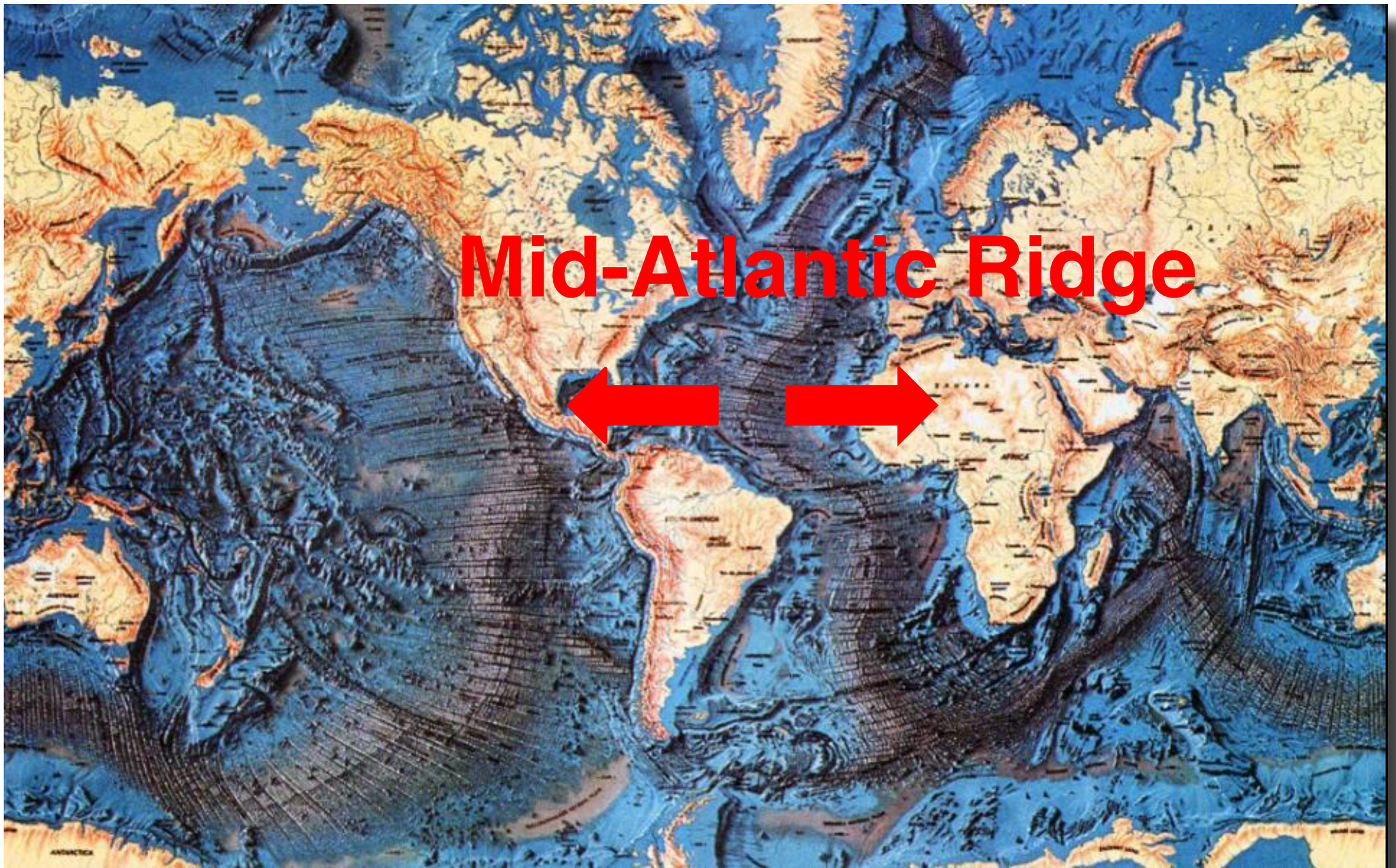


Spreading center

Divergent Plate Boundaries

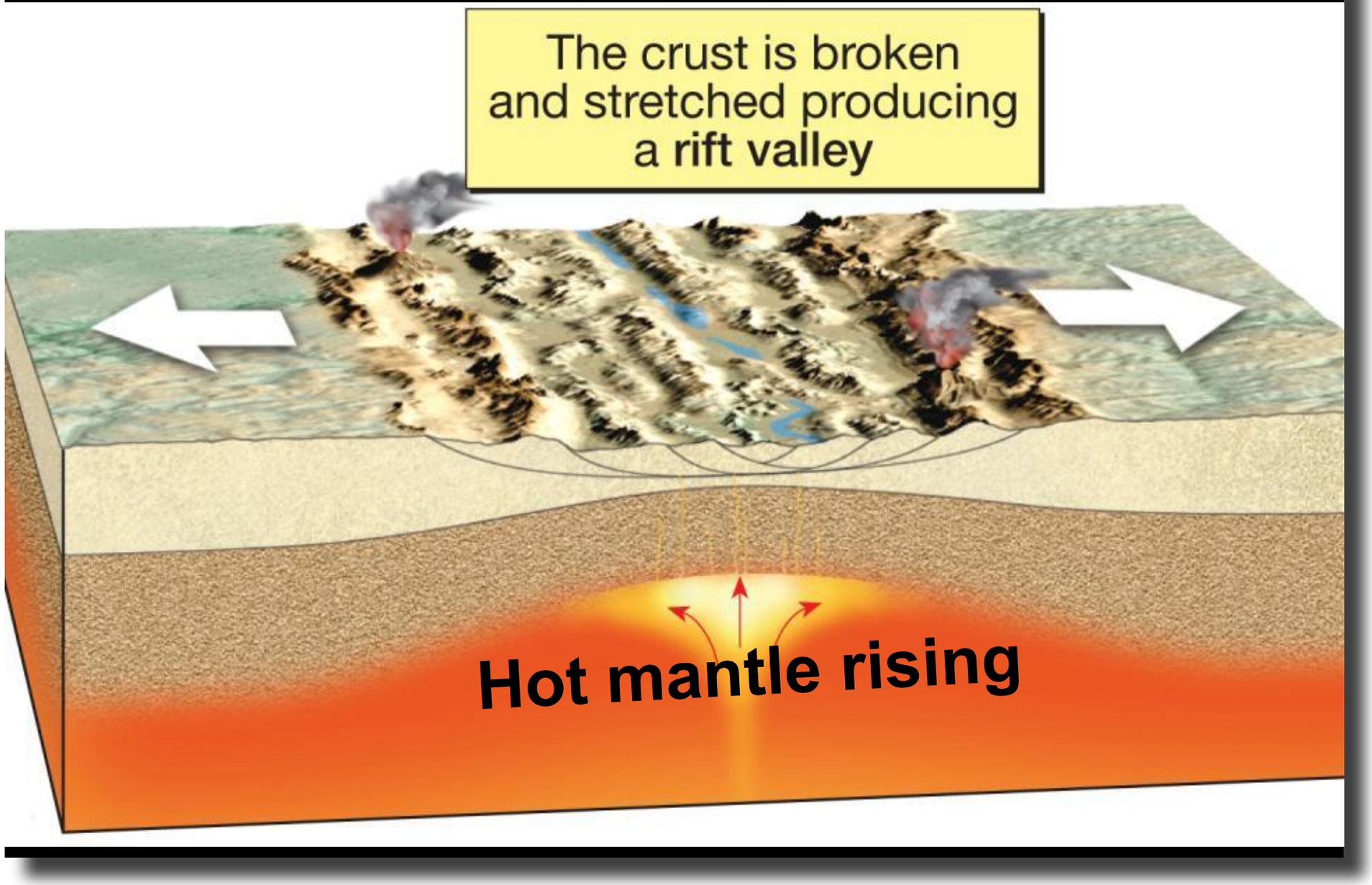
- Pull Apart
- Tension
- Create new rock (Lithosphere)
  - Occur under water (Oceanic Crust)
  - Occur on land (Continental Crust)

Mid Atlantic Ridge

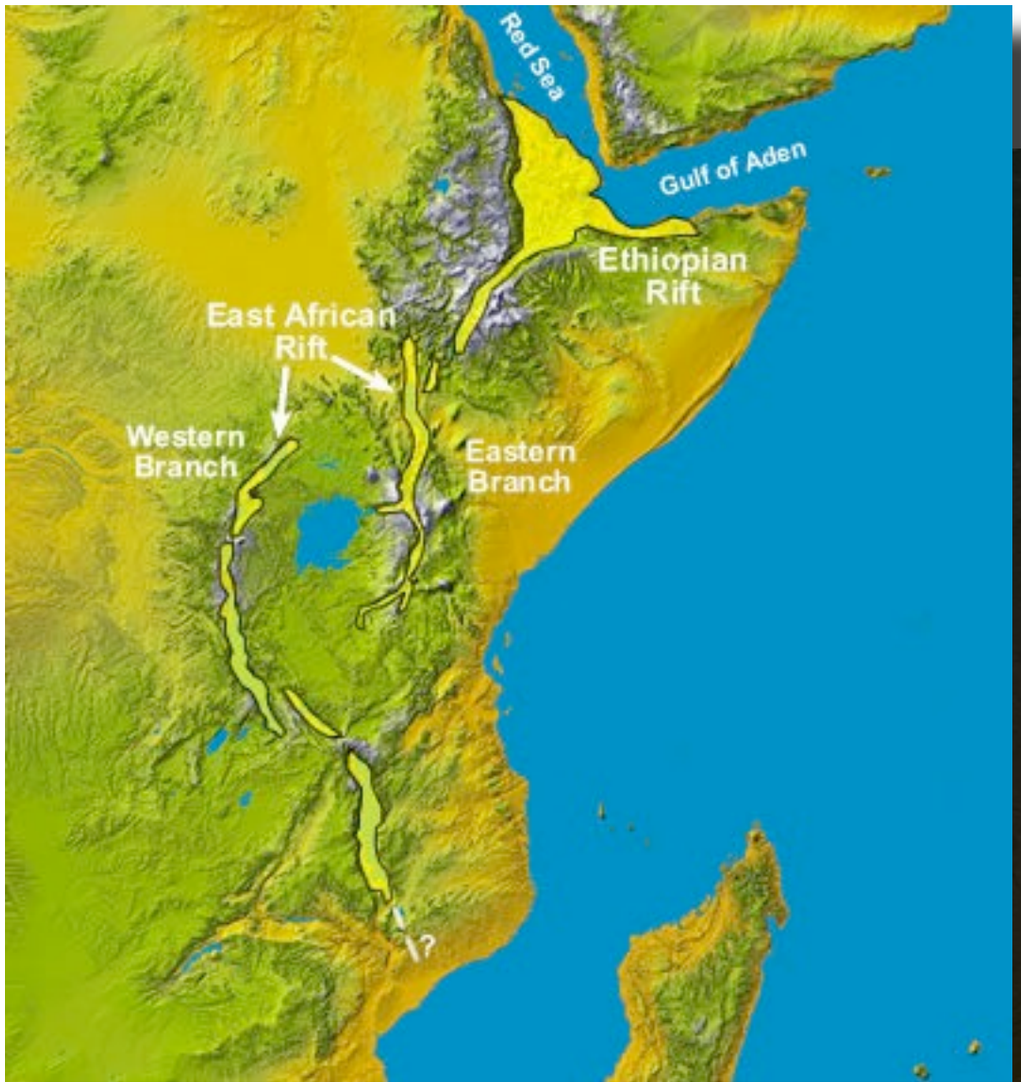


Continental Rifting

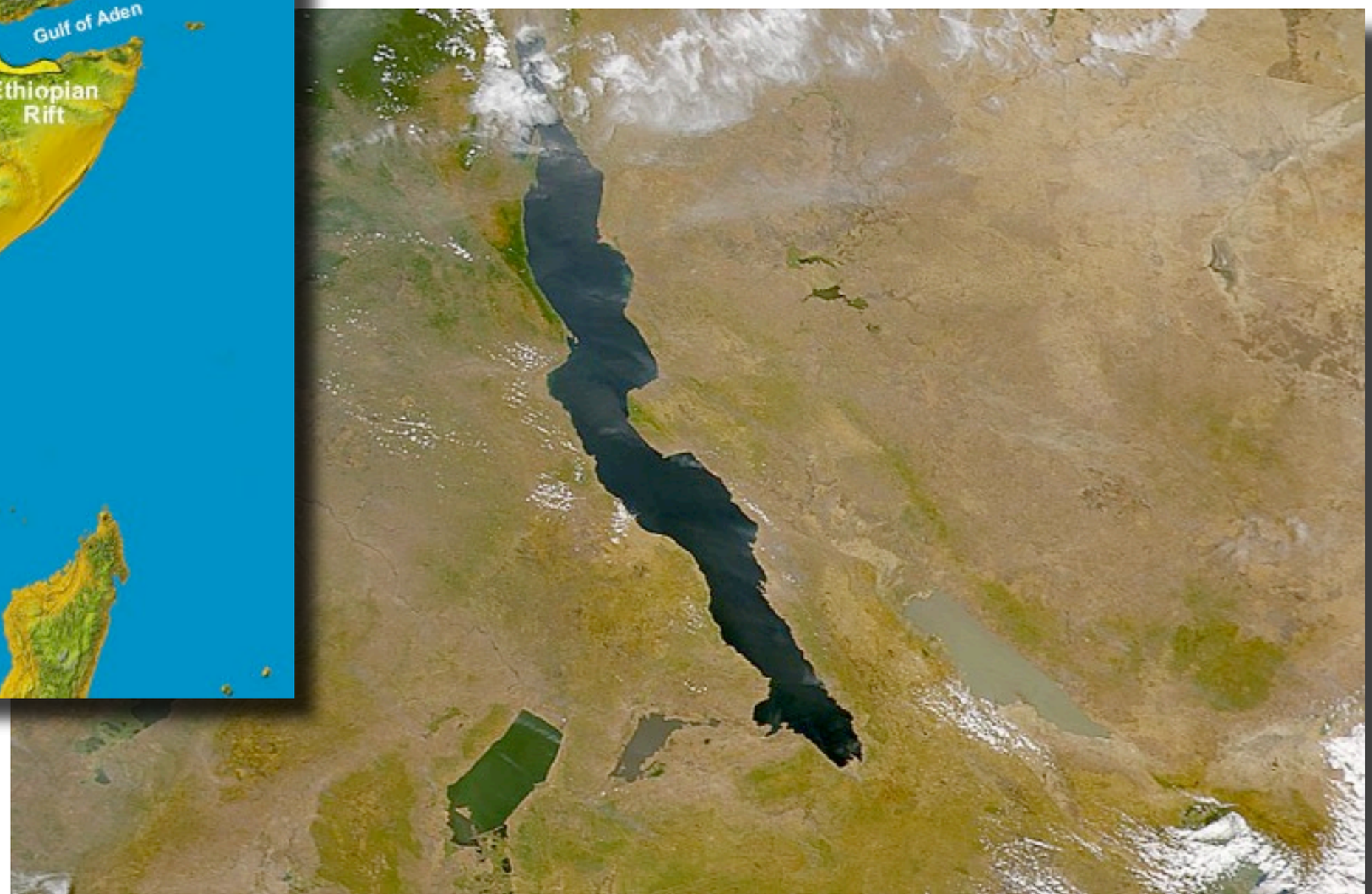
<u>Continental rifting</u>: spreading center opens under a continent



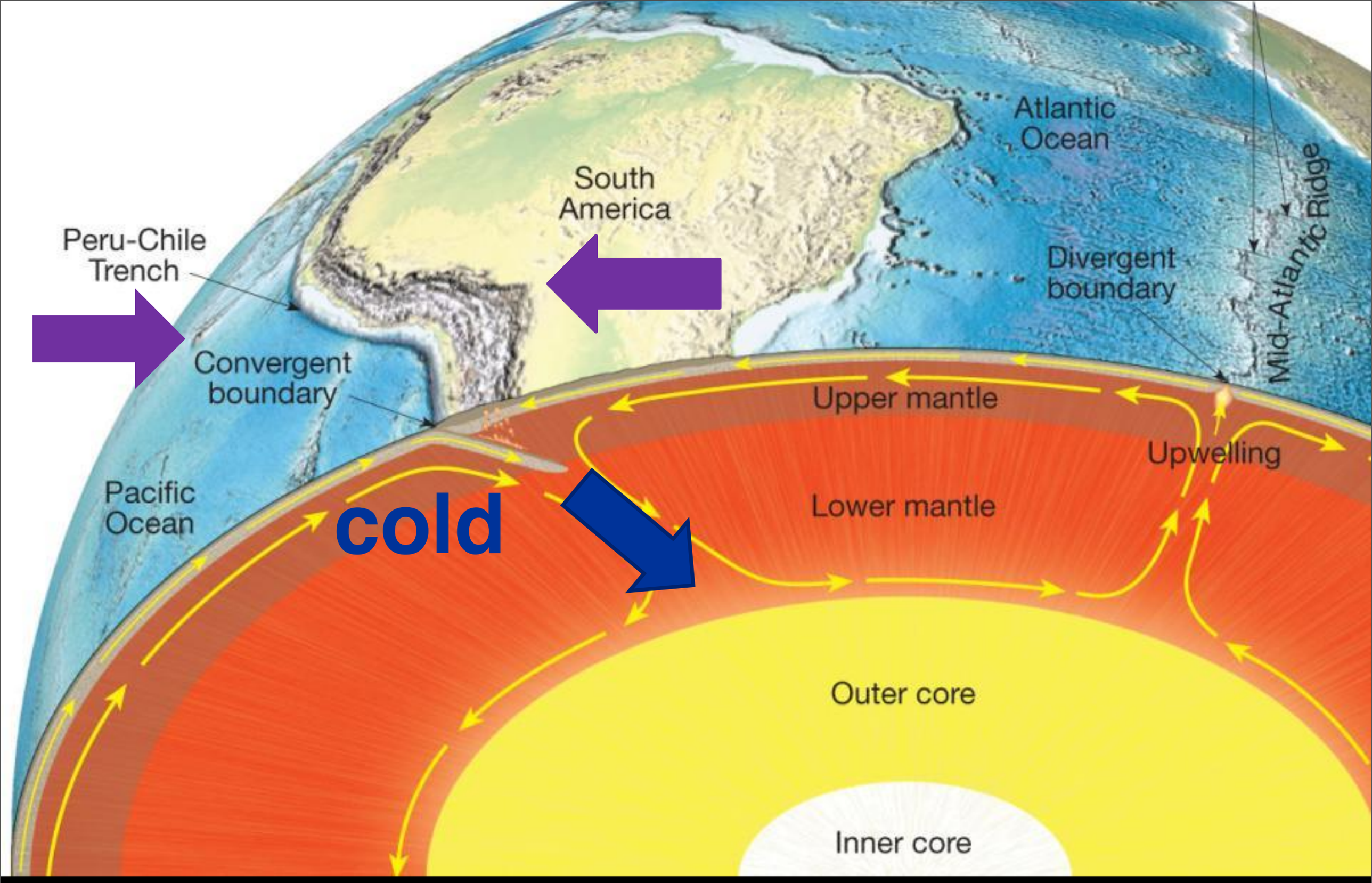
African Rift Valley



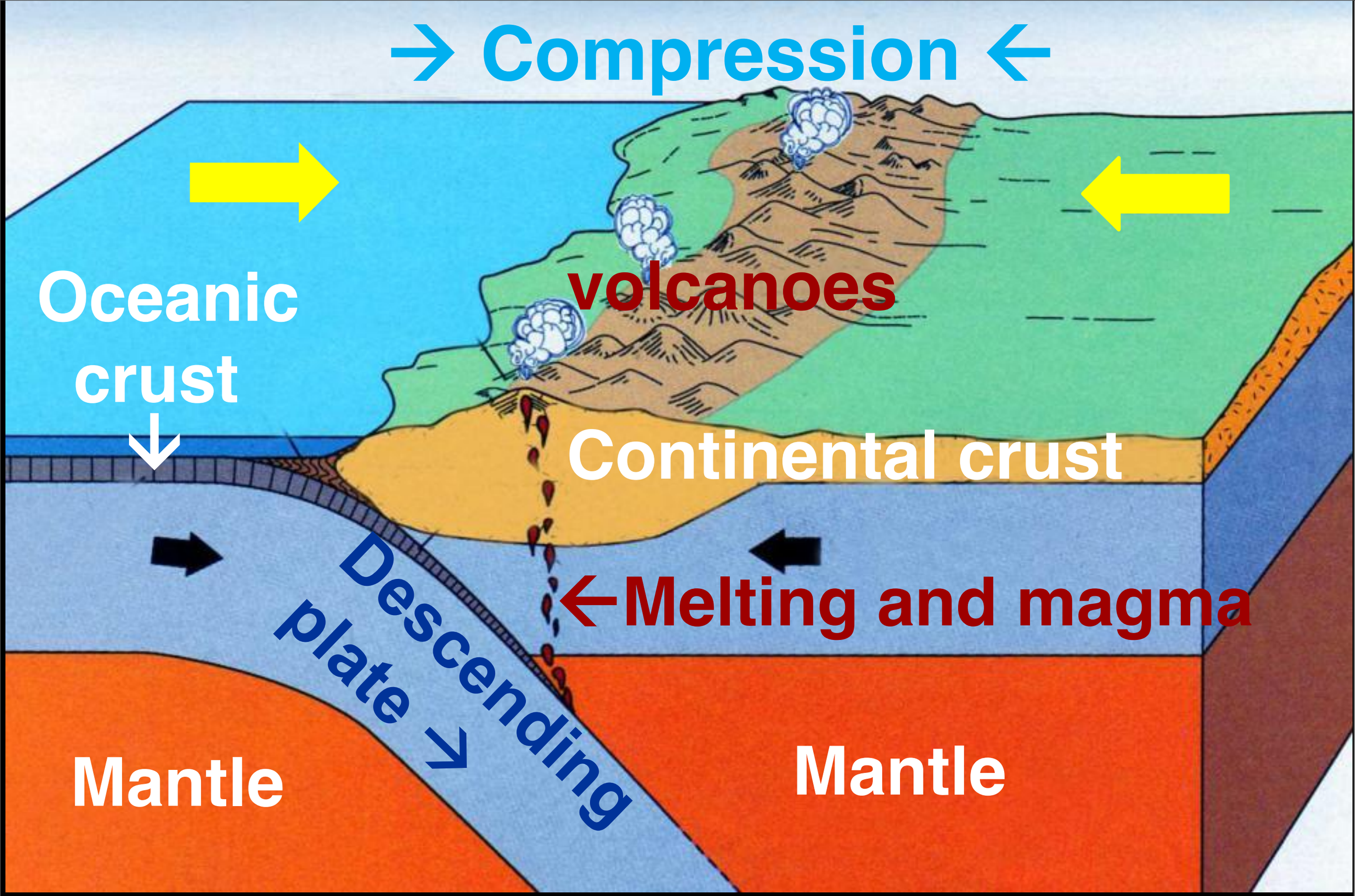
Example of Continental Rifting



Convergent Plate Boundaries



Subduction zone



Subduction zone

Convergent Plate Boundaries

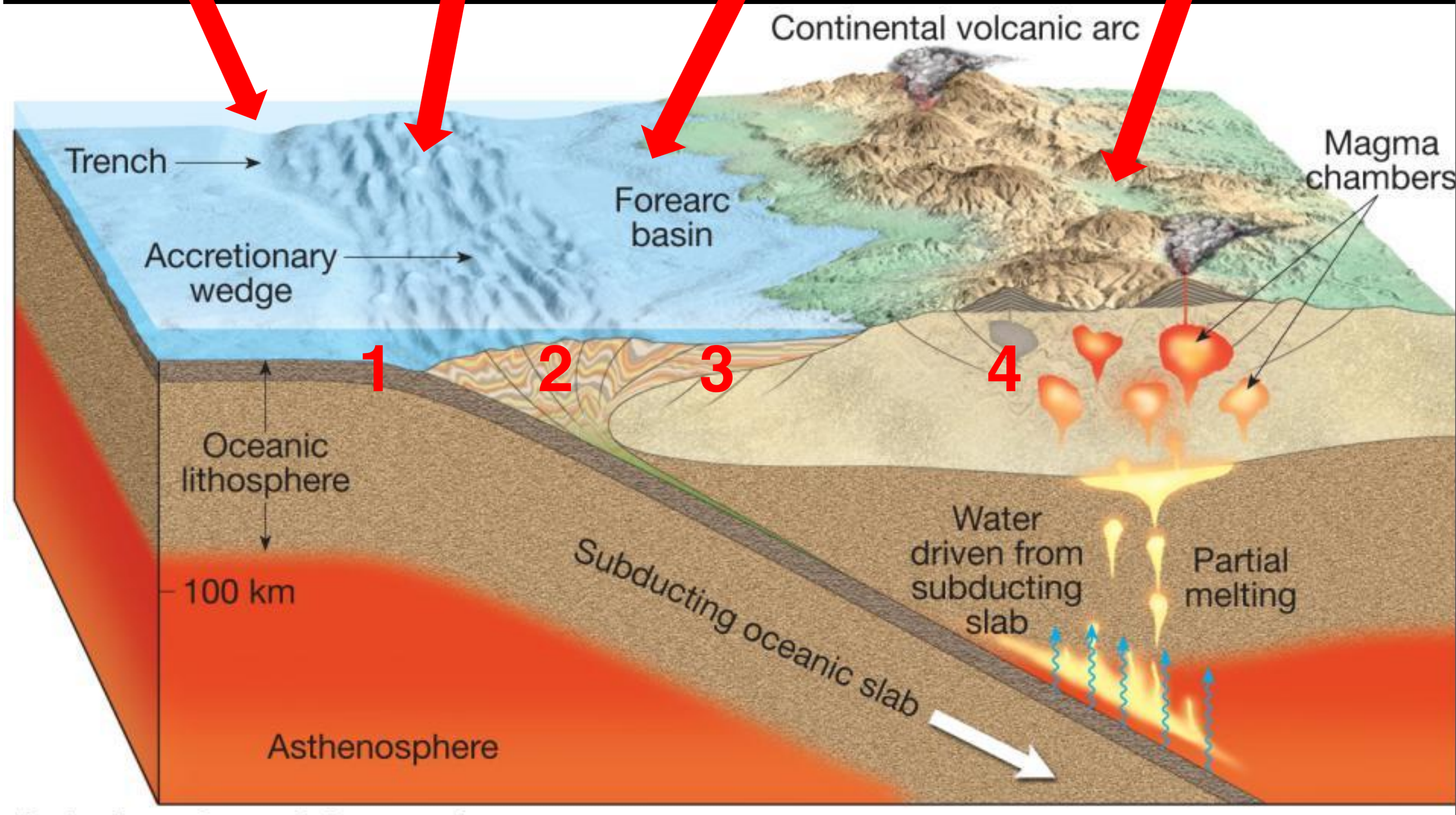
- Push together "plates collide"
- Compression
- Destroy/Recycle rock (lithosphere)

Deep Ocean Trench (1)

Accretionary Wedge (2)

Forearc Basin (3)

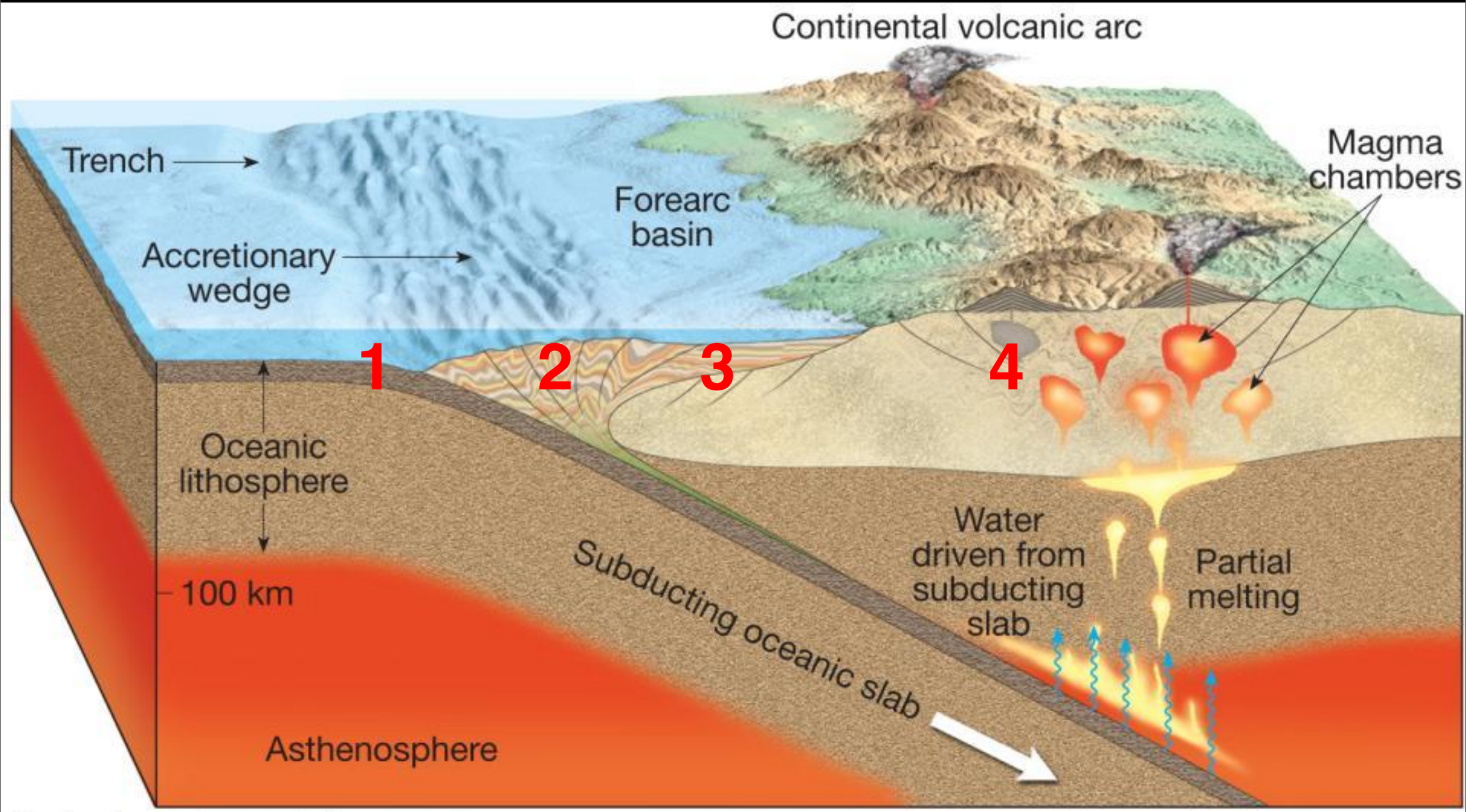
Volcanic Arc (4)



B. Andean-type plate margin

Subduction zones have several geomorphic features:

1. **A <u>deep ocean trench</u>, where the descending slab drags down the upper plate**
2. **An <u>accretionary wedge</u> of material scraped off of the descending slab**
3. **A <u>forearc basin</u> between the accretionary wedge and the volcanic arc**
4. **A <u>volcanic arc</u> produced by the eruption of andesitic magmas**



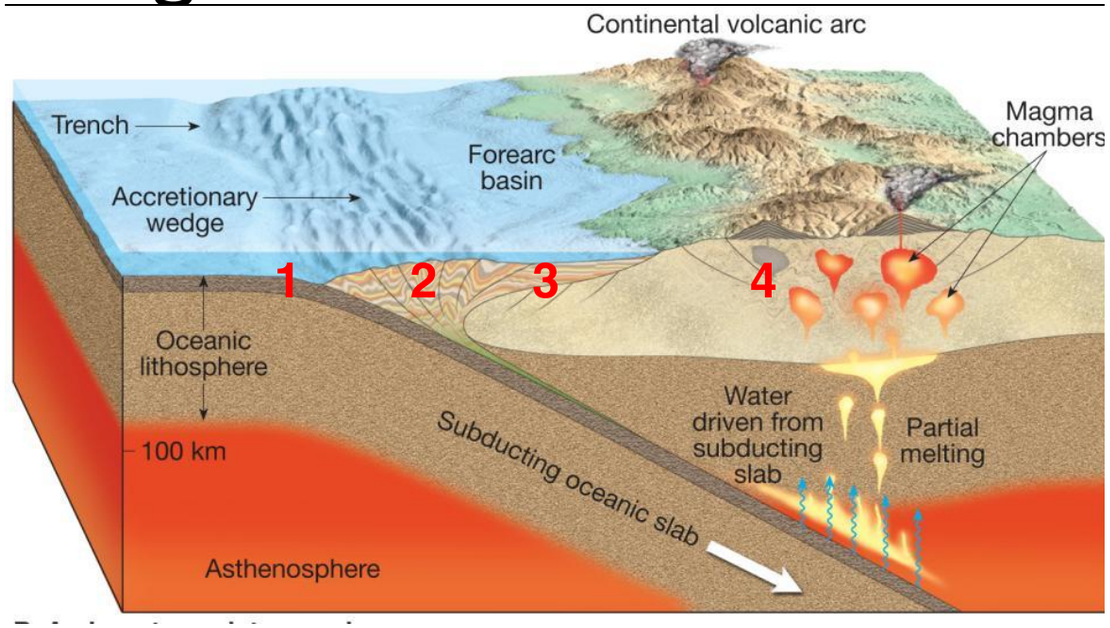
B. Andean-type plate margin

Convergent Plate Boundaries

- Three Possible Collisions
  - Oceanic-Continental Collision
  - Oceanic-Oceanic Collision
  - Continental-Continental Collision

Oceanic-Continental Collision

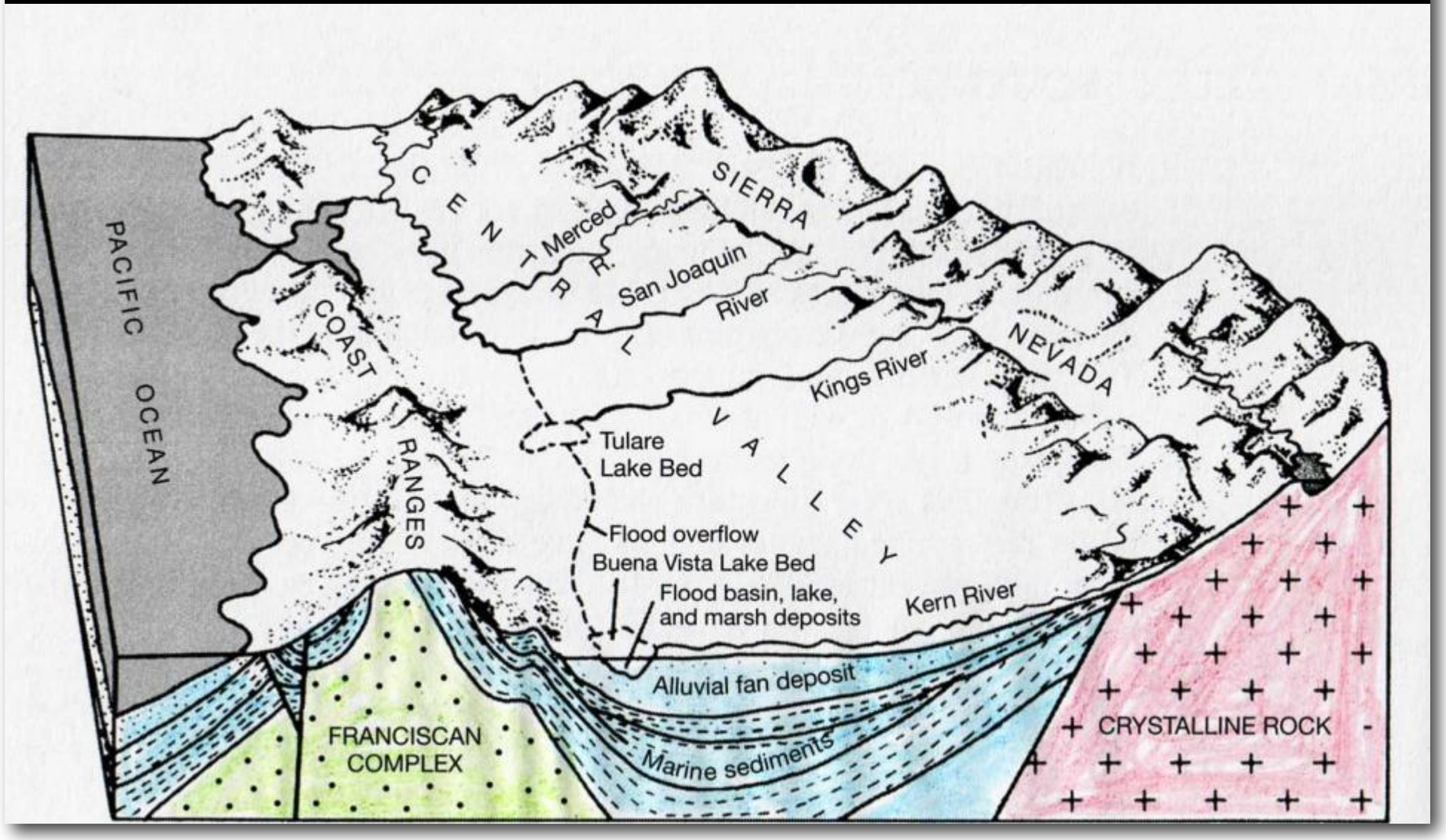
- Denser oceanic crust dives under continental crust
- Oceanic crust is then recycled by melting back into the mantle
- This massive collision creates deep ocean trenches, an accretionary wedge, a forearc basin, and a volcanic arc.
- Exactly like the California landscape.



California's Profile

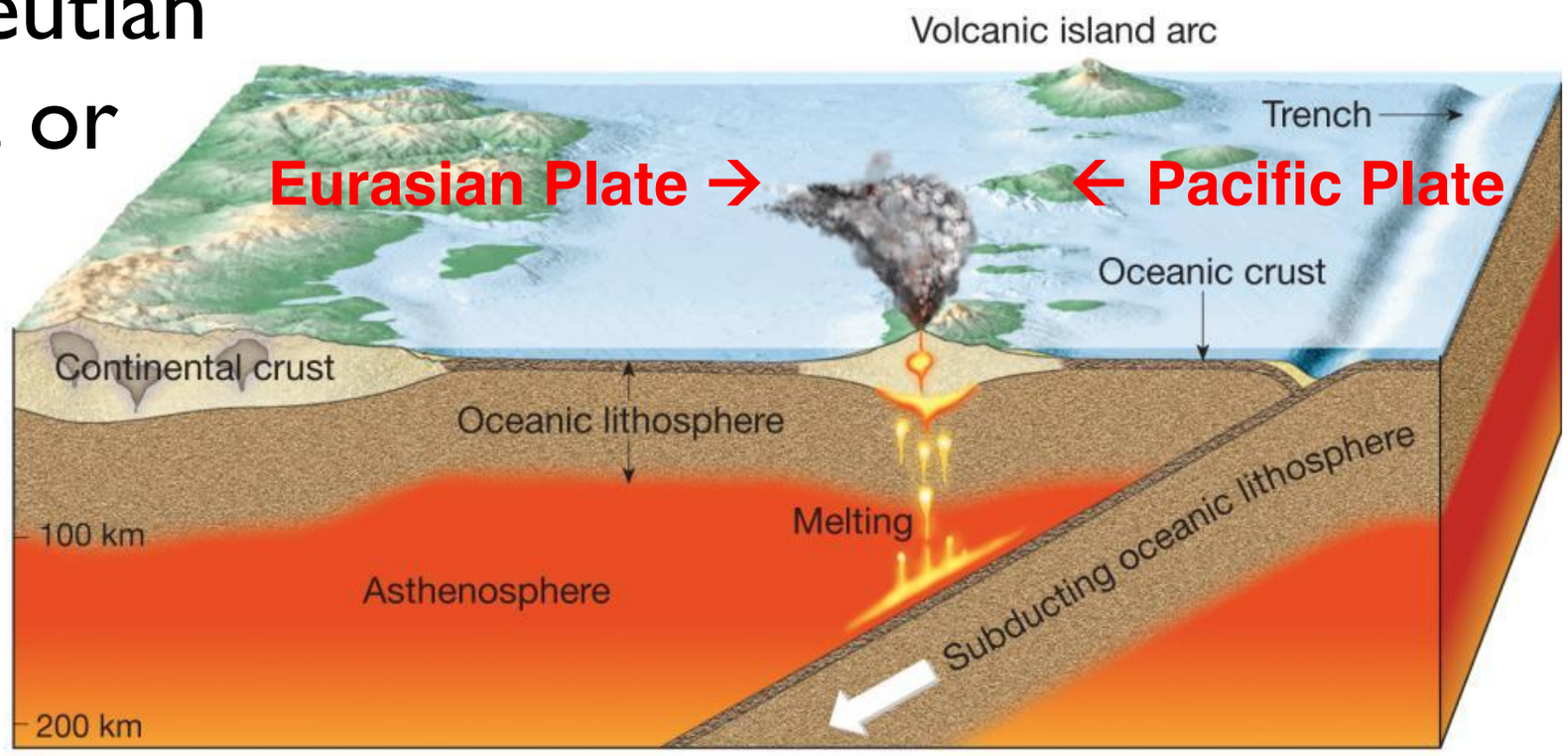
Accretionary Wedge | **Forearc Basin** | **Volcanic Arc**

Coast Ranges | **Central Valley** | **Sierra Nevada**



Oceanic-Oceanic Collision

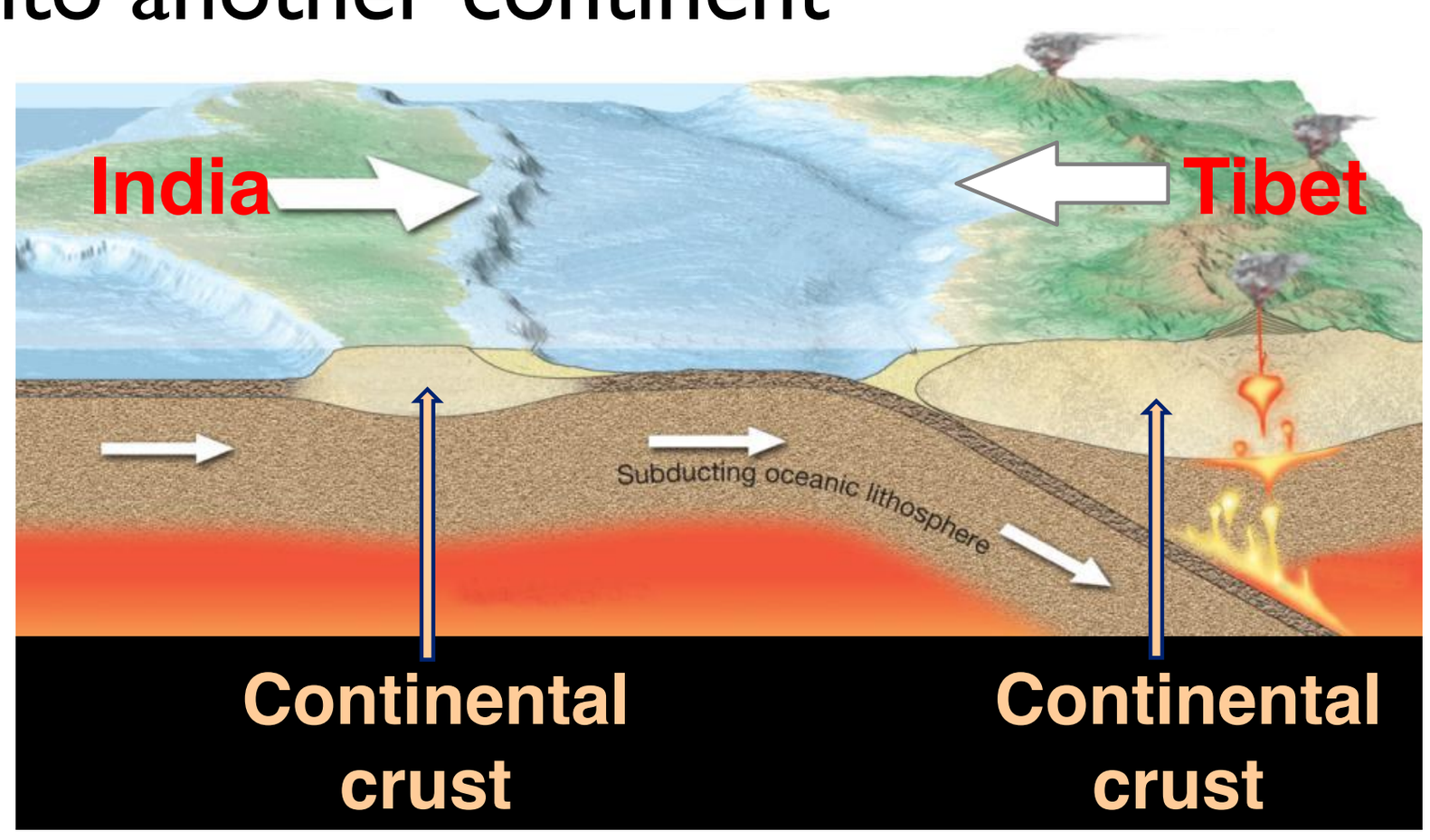
- One oceanic plate will subduct under another
- Creates deep ocean trenches
- Creates volcanic island arcs
- Example: the Aleutian Islands in Alaska or Japan



Aleutian Islands are a Volcanic Island Arc

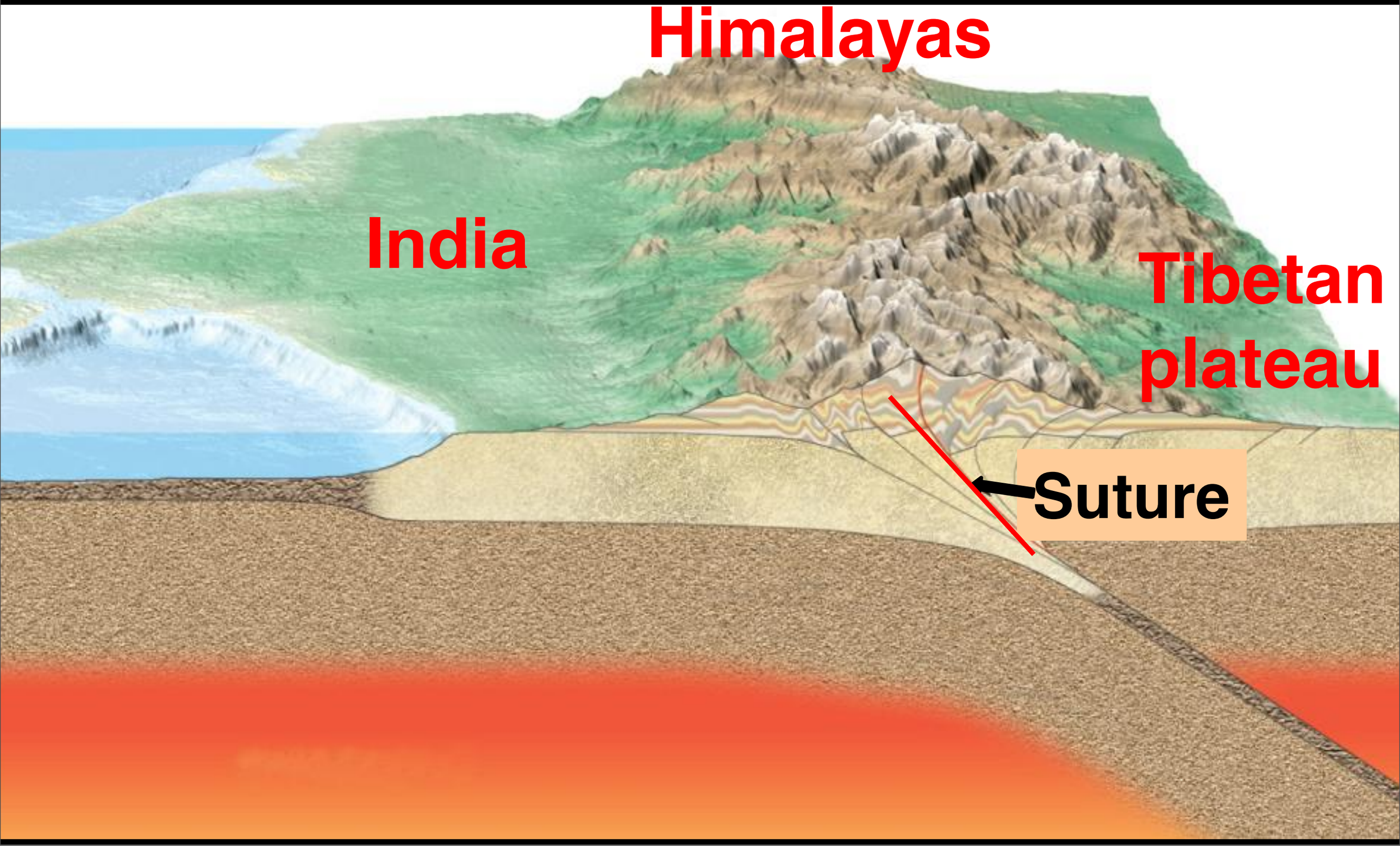
Continental-Continental Collision

- This occurs when continental crust is riding on a subducting plate and then smashes into another continent



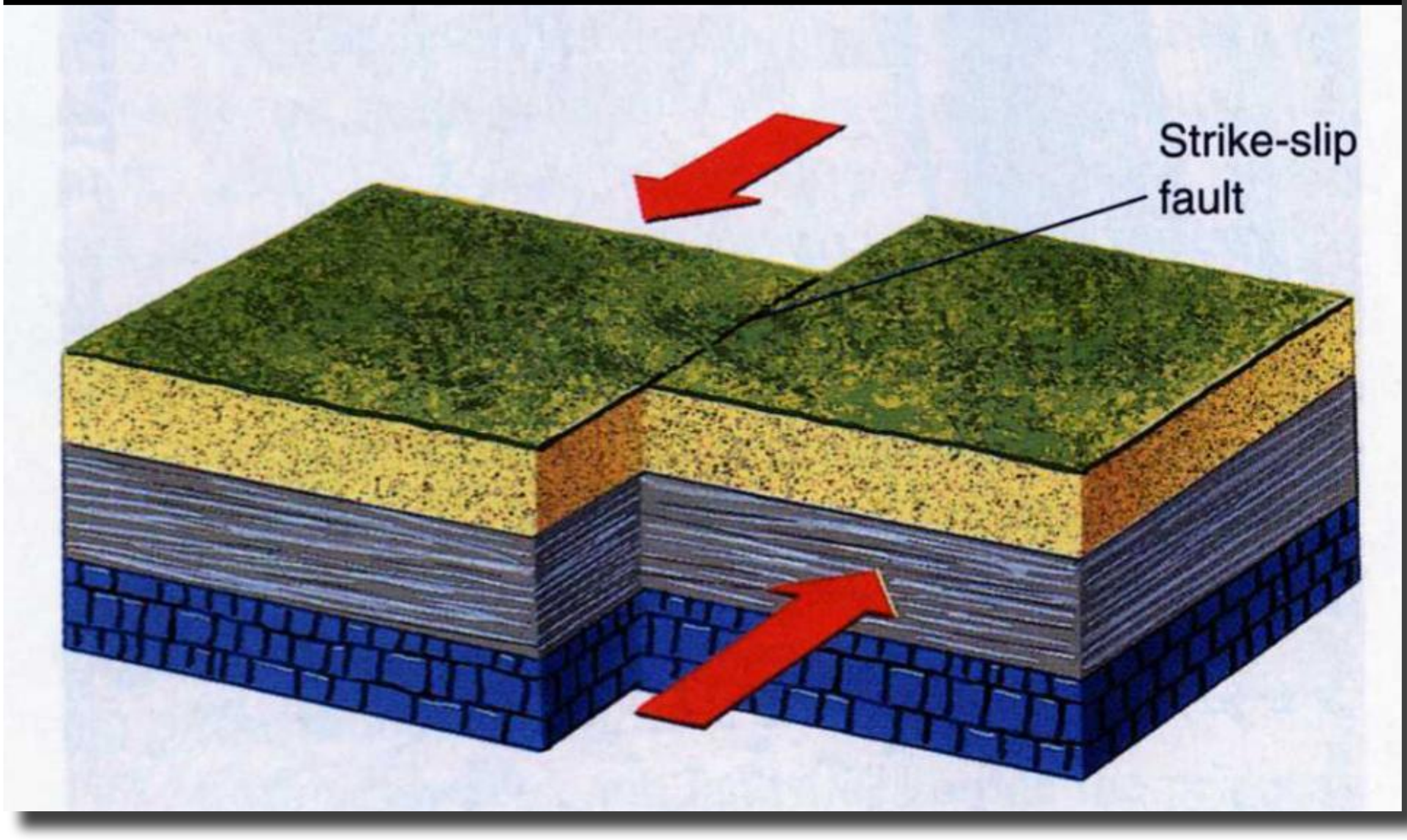
Indo-Australia Plate

Eurasia Plate



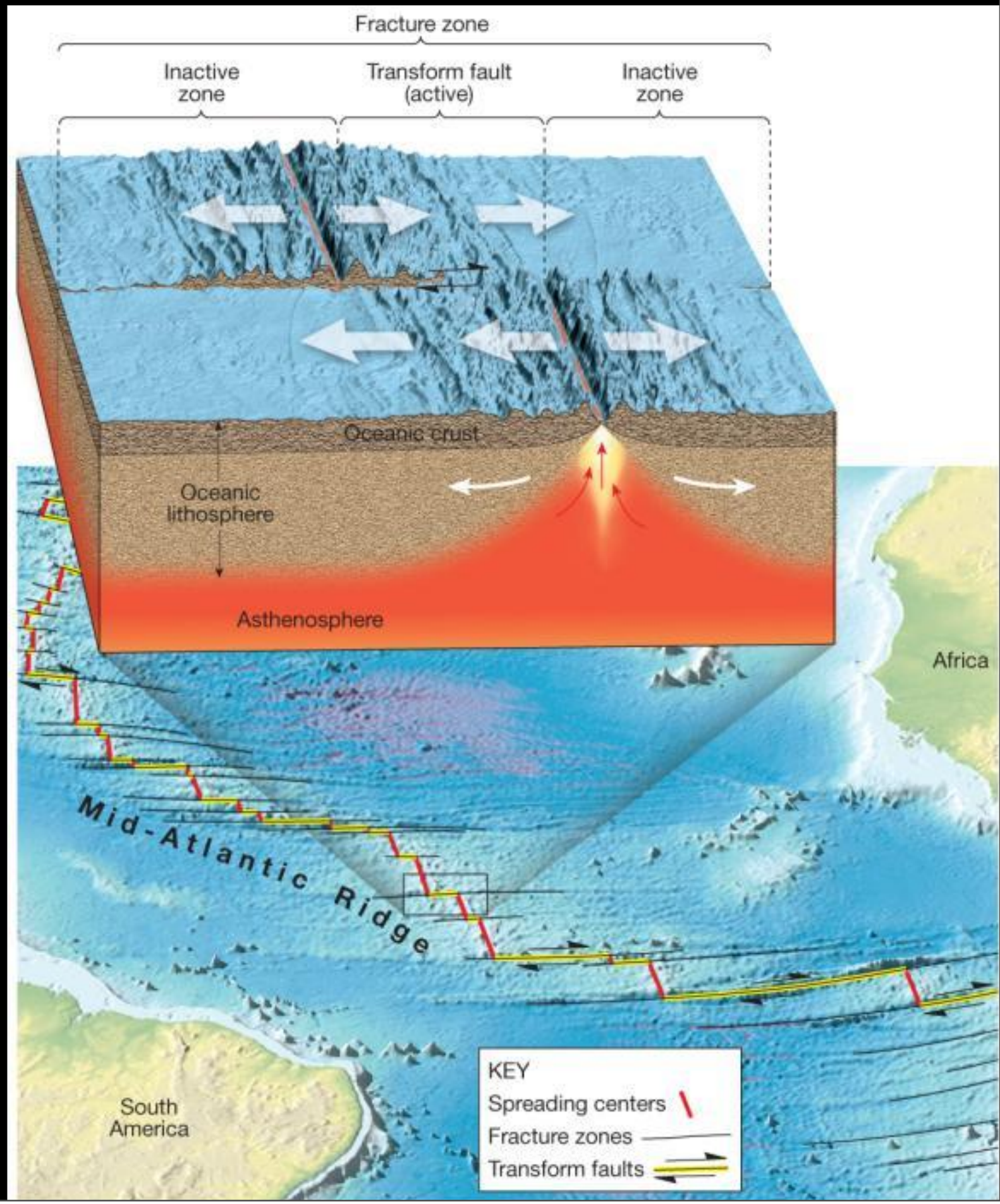
Transform Fault Boundaries

Transform fault boundary

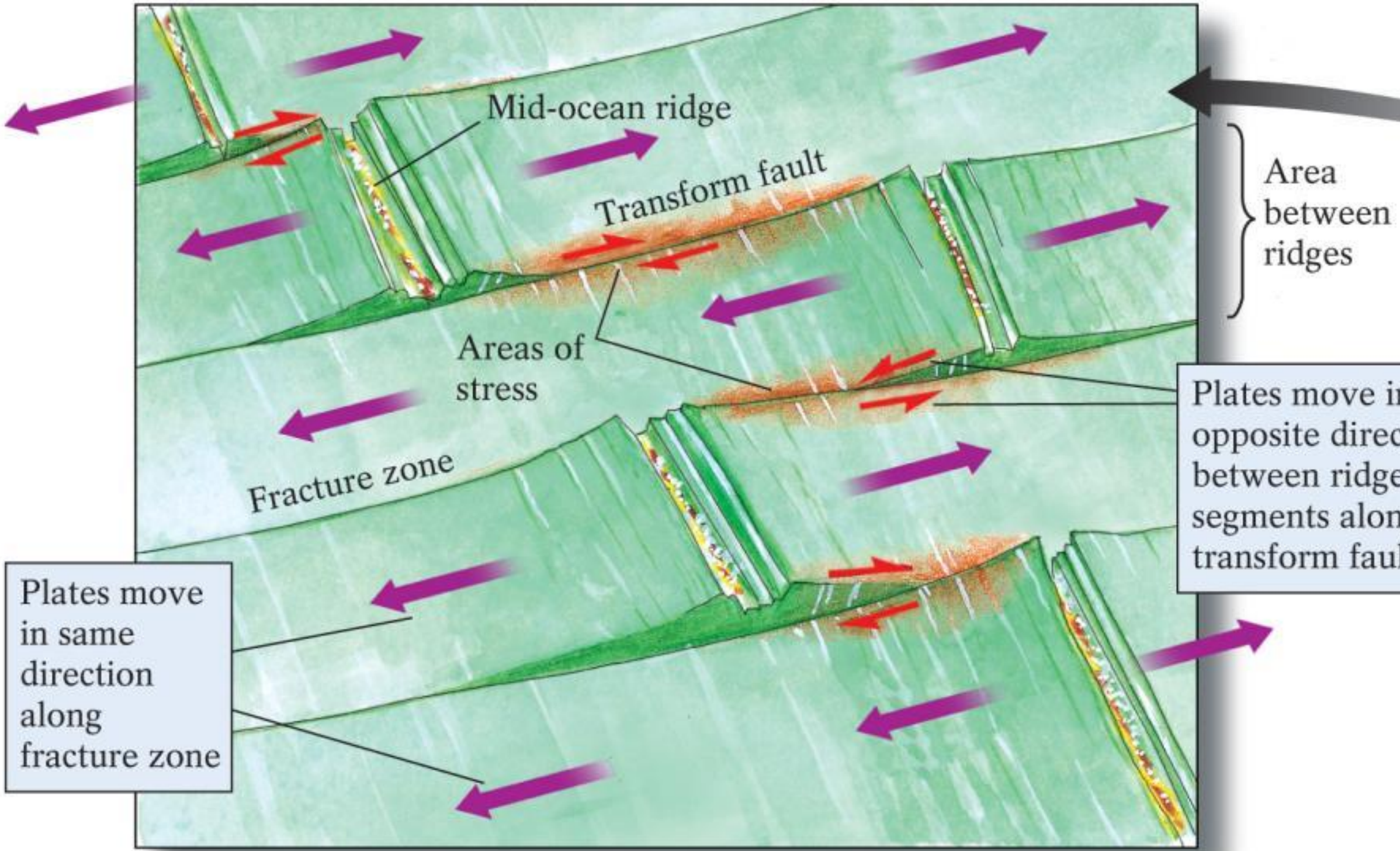


In the simplest form, plates slide past each other

Transform Faults connect other plate boundaries. They frequently offset mid-oceanic ridges (which can be thought of as jagged tears); in this case the transform faults connect two portions of a spreading center. Only <u>between</u> the offset portions of the spreading center are rocks moving in opposite directions (the <u>active region</u> of the transform fault; beyond the ridge segments, rock is moving in the same direction and there is no fault (<u>inactive region</u>), only a fracture zone.



Transform faults and fracture zones



San Andreas Fault

In Review

Three plate boundaries

1. Spreading Center: two plates created and diverge; oceanic crust forms

2. Subduction Zone: two plates converge and one is recycled; continental crust forms

3. Transform Fault: two plates slide past one another